NASA Glenn Success Stories

Atomic Oxygen Used to Remove Biologically Active Contaminants from Surgical Implants

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TECHNOLOGY

Removal of organic contaminants can be accomplished by exposure to oxygen atoms. Atomic oxygen can oxidize and completely remove all biologically active organic compounds, such as endotoxins that are typically found on the surfaces of orthopaedic implants.

COMMERCIAL APPLICATION

◆ The surfaces of orthopaedic implants are often contaminated with endotoxins and other biologically active contaminants, as a result of handling, fabrication and exposure in air. Such contaminants contribute to inflammation which can lead to joint loosening, pain and potential surgical removal. Previously, there was no known chemical process which fully removed endotoxins without damaging the implants. Atomic oxygen, however, can oxidize endotoxins and any other organic contaminants to convert them into harmless gases leaving a contaminant free surface. NASA Patent 6,558,621 for this technology is available for licensing.

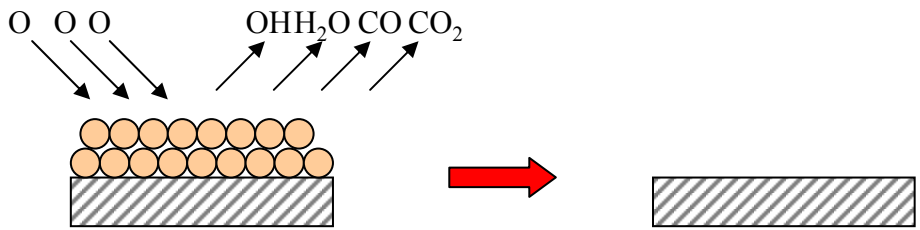
SOCIAL / ECONOMIC BENEFIT

◆ Reduction in health care costs for over 2.8 million recipients of orthopaedic implants as a result of fewer surgical complications and revision of the implants

◆ Increased functional life of implants

◆ Reduced inflammation and associated joint pain for patients

Concept:



Atomic Oxygen technology can be used to completely remove endotoxins from orthopaedic surgical implants

NASA APPLICATIONS

◆ Technology developed for simulation of the low Earth orbital space environment has made it possible to assess spacecraft materials durability where atomic oxygen is most abundant gas

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